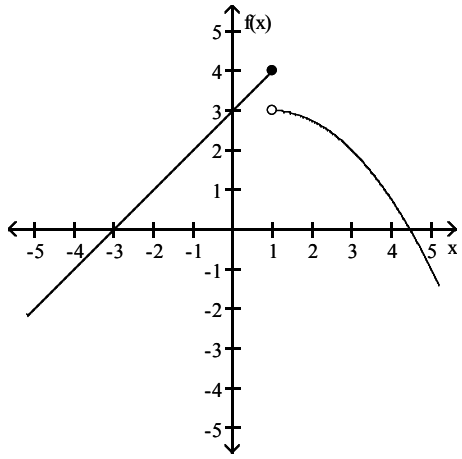
MAC 2233 –– Lial
Final Exam Review

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

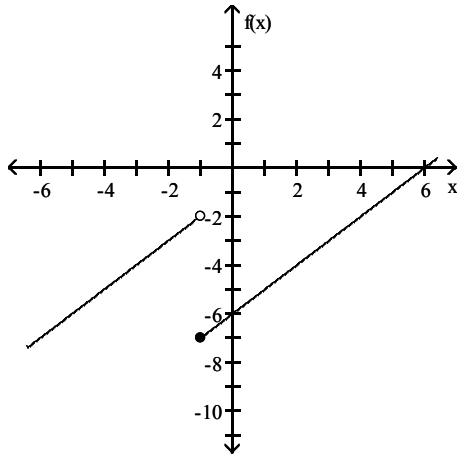
Decide whether the limit exists. If it exists, find its value.

1) $\lim_{x \to 1^+} f(x)$ 1) _____



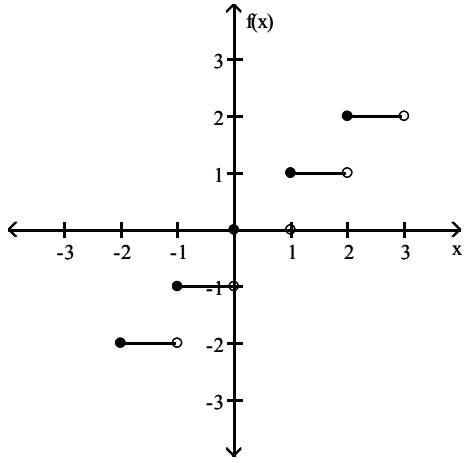
A) Does not exist B) 4 C) $3\frac{1}{2}$ D) 3

2) $\lim_{x \to (-1)^-} f(x)$ and $\lim_{x \to (-1)^+} f(x)$ 2) _____



A) –2, –7 B) –5, –2 C) –7, –2 D) –7, –5

3) $\lim_{x \to -1} f(x)$ 3) _____



A) –2 B) –1 C) 0 D) Does not exist

Use the properties of limits to help decide whether the limit exists. If the limit exists, find its value.

4) $\lim_{x \to 5} \frac{x^2 - 25}{x^2 - 9x + 20}$ 4) _____

A) Does not exist B) 5 C) 10 D) 0

5) $\lim_{x \to 10} \frac{x^2 - 100}{x - 10}$ 5) _____

A) 20 B) Does not exist C) 1 D) 10

6) $\lim_{h \to 0} \frac{(x + h)^3 - x^3}{h}$ 6) _____

A) 0 B) $3x^2$ C) Does not exist D) $3x^2 + 3xh + h^2$

7) $\lim_{x \to -9} \frac{x^2 + 10x + 9}{x + 9}$ 7) _____

A) 180 B) –8 C) 10 D) Does not exist

8) $\lim_{x \to \infty} \frac{4x^2 + 3x - 6}{-6x^2 + 6}$ 8) _____

A) ∞ B) 0 C) – 1 D) $-\frac{2}{3}$

9) $\lim_{x \to -\infty} \frac{x}{2x - 7}$ 9) _____

A) ∞ B) $\frac{1}{2}$ C) $-\frac{1}{2}$ D) 0

10) $\lim_{x \to \infty} \frac{4x^2 + 6x - 8x^5}{6x^2 - 8x + 5}$ 10) _____

A) Does not exist B) $\frac{2}{3}$ C) $-\infty$ D) ∞

Find the average rate of change for the function over the given interval.

11) $y = x^2 + 8x$ between $x = 4$ and $x = 6$ 11) _____

A) 18 B) 14 C) 6 D) 42

12) $y = 4x^2$ between $x = 0$ to $x = \frac{7}{4}$ 12) _____

A) $\frac{1}{3}$ B) $-\frac{3}{10}$ C) 7 D) 2

Find the instantaneous rate of change for the function at the given value.

13) $F(x) = x^2 + 9x$ at $x = 8$ 13) _____

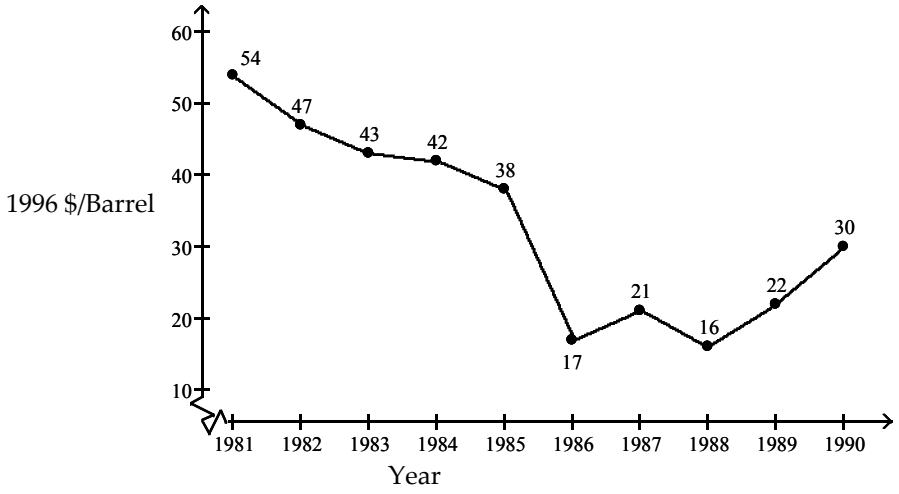
A) 17 B) 16 C) 25 D) 136

14) $F(x) = 2x^2 + x - 3$ at $x = 4$ 14) _____

A) 19 B) 15 C) 5 D) 17

Solve the problem.

15) The graph shows the average cost of a barrel of crude oil for the years 1981 to 1990 in constant 1996 dollars. Find the approximate average change in price from 1981 to 1990. 15) _____



A) About –$24/year B) About –$44/year

C) About –$4/year D) About –$1/year

16) Suppose that the revenue from selling x radios is $R(x) = 70x - \frac{x^2}{10}$ dollars. Use the function $R'(x)$ to estimate the increase in revenue that will result from increasing production from 120 radios to 121 radios per week. 16) _____

A) $94.00 B) $45.80 C) $58.00 D) $46.00

Find the derivative.

17) $f(x) = 4x^2 + 4x - 7$, find $f'(x)$ 17) _____

A) $4x + 4$ B) $4x^2 + 4$ C) $8x^2 + 4$ D) $8x + 4$

18) $y = 12x^{-2} + 14x^3 - 8x$, find $f'(x)$ 18) _____

A) $-24x^{-3} + 42x^2 - 8$ B) $-24x^{-3} + 42x^2$

C) $-24x^{-1} + 42x^2$ D) $-24x^{-1} + 42x^2 - 8$

19) $f(x) = 9x^{7/5} - 5x^2 + 10^4$, find $f'(x)$ 19) _____

A) $\frac{63}{5}x^{2/5} - 10x + 4000$ B) $\frac{63}{5}x^{2/5} - 10x$

C) $\frac{63}{5}x^{6/5} - 10x + 4000$ D) $\frac{63}{5}x^{6/5} - 10x$

20) $f(x) = \frac{4}{\sqrt{x}} - \frac{4}{x} + \frac{8}{x^4}$, find $f'(x)$ 20) _____

A) $-\frac{2}{x^{3/2}} - \frac{4}{x^2} - \frac{32}{x^3}$ B) $-\frac{2}{x^{3/2}} + \frac{4}{x^2} - \frac{32}{x^5}$

C) $-2\sqrt{x} + \frac{4}{x^2} - \frac{32}{x^3}$ D) $\frac{2}{x^{1/2}} - \frac{4}{x^2} - \frac{32}{x^5}$

Find the derivative of the given function.

21) $y = (2x^2 + 2x)^2$ 21) _____

A) $16x^3 + 12x^2 + 8x$ B) $8x^3 + 12x^2 + 4x$

C) $8x^3 + 12x^2 + 8x$ D) $16x^3 + 24x^2 + 8x$

Find the slope of the line tangent to the graph of the function at the given value of x.

22) $y = x^4 + 4x^3 - 2x + 2$; $x = 2$ 22) _____

A) 38 B) 80 C) 40 D) 78

23) $y = -8x^{-1} + 5x^{-2}$; $x = 2$ 23) _____

A) $\frac{13}{4}$ B) $-\frac{3}{4}$ C) $-\frac{13}{4}$ D) $\frac{3}{4}$

24) $y = 9x^{5/2} - 7x^{3/2}$; $x = 4$ 24) _____

A) 159 B) 6 C) 96 D) 8

Find an equation for the line tangent to given curve at the given value of x.

25) $y = \frac{x^2}{2}$; $x = -2$ 25) _____

A) $y = -2x - 4$ B) $y = -2x - 2$ C) $y = -4x - 2$ D) $y = -2x + 2$

26) $y = x^3 - 4x - 2$; $x = 2$ 26) _____

A) $y = -2$ B) $y = 8x - 2$ C) $y = 8x - 18$ D) $y = 6x - 18$

Solve the following.

27) Find all points of the graph of $f(x) = 3x^2 + 9x$ whose tangent lines are parallel to the line $y - 39x = 0$. 27) _____

A) (8, 264) B) (5, 120) C) (6, 162) D) (7, 210)

Find all values of x (if any) where the tangent line to the graph of the function is horizontal.

28) $y = x^2 + 2x - 3$ 28) _____

A) $\frac{1}{2}$ B) 0 C) –1 D) 1

29) $y = x^3 - 3x^2 + 1$ 29) _____

A) –2, 0, 2 B) 0 C) 0, 2 D) 2

30) $y = x^3 + 5x^2 - 88x + 22$ 30) _____

A) 4 B) $-\frac{22}{3}, 4$ C) $-\frac{22}{3}, \frac{22}{3}, 4$ D) $\frac{22}{3}, -4$

Solve the problem.

31) The profit in dollars from the sale of x thousand compact disc players is $P(x) = x^3 - 2x^2 + 10x + 9$. Find the marginal profit when the value of x is 3. 31) _____

A) \$25 B) \$34 C) \$45 D) \$36

32) For a motorcycle traveling at speed v (in mph) when the brakes are applied, the distance d (in feet) required to stop the motorcycle may be approximated by the formula $d = 0.05\,v^2 + v$. Find the instantaneous rate of change of distance with respect to velocity when the speed is 41 mph. 32) _____

A) 10.2 mph B) 42 mph C) 4.1 mph D) 5.1 mph

Use the product rule to find the derivative.

33) $f(x) = (2x - 5)(3x + 1)$ 33) _____

A) $f'(x) = 12x - 13$ B) $f'(x) = 6x - 13$ C) $f'(x) = 12x - 17$ D) $f'(x) = 12x - 6.5$

34) $f(x) = (2x - 3)(\sqrt{x} + 2)$ 34) _____

A) $f'(x) = 1.33x^{1/2} - 1.5x^{-1/2} + 4$ B) $f'(x) = 3x^{1/2} - 3x^{-1/2} + 4$

C) $f'(x) = 3x^{1/2} - 1.5x^{-1/2} + 4$ D) $f'(x) = 1.33x^{1/2} - 3x^{-1/2} + 4$

35) $f(x) = (3x^4 + 8)^2$ 35) _____

A) $f'(x) = 144x^{15} + 96x^3$ B) $f'(x) = 72x^7 + 192x^3$

C) $f'(x) = 6x^4 + 16$ D) $f'(x) = 9x^{16} + 64$

Use the quotient rule to find the derivative.

36) $f(x) = \frac{1}{x^7 + 2}$ 36) _____

A) $f'(x) = \frac{1}{(7x^7 + 2)^2}$ B) $f'(x) = \frac{7x^6}{(x^7 + 2)^2}$

C) $f'(x) = -\frac{7x^6}{(x^7 + 2)^2}$ D) $f'(x) = -\frac{1}{(7x^7 + 2)^2}$

37) $y = \dfrac{x^2 + 8x + 3}{\sqrt{x}}$ 37) _____

A) $\dfrac{dy}{dx} = \dfrac{3x^2 + 8x - 3}{2x^{3/2}}$

B) $\dfrac{dy}{dx} = \dfrac{2x + 8}{2x^{3/2}}$

C) $\dfrac{dy}{dx} = \dfrac{3x^2 + 8x - 3}{x}$

D) $\dfrac{dy}{dx} = \dfrac{2x + 8}{x}$

38) $g(x) = \dfrac{x^2 + 5}{x^2 + 6x}$ 38) _____

A) $g'(x) = \dfrac{2x^3 - 5x^2 - 30x}{x^2(x + 6)^2}$

B) $g'(x) = \dfrac{6x^2 - 10x - 30}{x^2(x + 6)^2}$

C) $g'(x) = \dfrac{4x^3 + 18x^2 + 10x + 30}{x^2(x + 6)^2}$

D) $g'(x) = \dfrac{x^4 + 6x^3 + 5x^2 + 30x}{x^2(x + 6)^2}$

Find the derivative.

39) $y = (4x + 3)^5$ 39) _____

A) $\dfrac{dy}{dx} = (4x + 3)^4$

B) $\dfrac{dy}{dx} = 5(4x + 3)^4$

C) $\dfrac{dy}{dx} = 20(4x + 3)^4$

D) $\dfrac{dy}{dx} = 4(4x + 3)^4$

40) $f(x) = (x^3 - 8)^{2/3}$ 40) _____

A) $f'(x) = \dfrac{x^2}{\sqrt[3]{x^3 - 8}}$

B) $f'(x) = \dfrac{x}{\sqrt[3]{x^3 - 8}}$

C) $f'(x) = \dfrac{2x}{\sqrt[3]{x^3 - 8}}$

D) $f'(x) = \dfrac{2x^2}{\sqrt[3]{x^3 - 8}}$

41) $y = (x + 1)^2(x^2 + 1)^{-3}$ 41) _____

A) $\dfrac{dy}{dx} = 2(x + 1)(x^2 + 1)^{-4}(2x^2 + 3x - 1)$

B) $\dfrac{dy}{dx} = -2(x + 1)(x^2 + 1)^{-4}(2x^2 - 3x - 1)$

C) $\dfrac{dy}{dx} = 2(x + 1)(x^2 + 1)^{-4}(2x^2 - 3x - 1)$

D) $\dfrac{dy}{dx} = -2(x + 1)(x^2 + 1)^{-4}(2x^2 + 3x - 1)$

42) $y = \dfrac{\sqrt[3]{x^2 + 3}}{x}$ 42) _____

A) $\dfrac{dy}{dx} = \dfrac{-x^2 - 9}{3x^2(x^2 + 3)^{2/3}}$

B) $\dfrac{dy}{dx} = \dfrac{3}{x^2(x^2 + 3)^{2/3}}$

C) $\dfrac{dy}{dx} = \dfrac{x^2 + 9}{3x^2(x^2 + 3)^{2/3}}$

D) $\dfrac{dy}{dx} = \dfrac{-3}{x^2(x^2 + 3)^{2/3}}$

43) $y = (2x - 1)^3(x + 7)^{-3}$ 43) _____

A) $\frac{dy}{dx} = 45(2x - 1)^3(x + 7)^{-2}$

B) $\frac{dy}{dx} = 45(2x - 1)^2(x + 7)^{-4}$

C) $\frac{dy}{dx} = 45(2x - 1)^2(x + 7)^{-3}$

D) $\frac{dy}{dx} = 45(2x - 1)^3(x + 7)^{-4}$

44) $y = -8e^{10x}$ 44) _____

A) $-80e^{10x}$ B) $-8xe^{-80x}$ C) $-80xe^{10x}$ D) $-8e^{-80x}$

45) $y = 4e^{x^2}$ 45) _____

A) $8xe^{2x}$ B) $8xe$ C) $8xe^{4x^2}$ D) $8xe^{x^2}$

46) $y = \frac{e^{-x} + 1}{e^x}$ 46) _____

A) $\frac{-e^x - 2}{e^{2x}}$ B) $\frac{e^x - 2}{e^{2x}}$ C) $\frac{e^x + 2}{e^{2x}}$ D) $\frac{-e^x + 2}{e^{2x}}$

47) $y = (x + 2)^5e^{-2x}$ 47) _____

A) $(x + 2)^4(x + 7)\ e^{-2x}$

B) $-(x + 2)^4(2x + -1)\ e^{-2x}$

C) $-10(x + 2)^4e^{-2x}$

D) $-(x + 2)^4(2x + -1)\ e^{-3x}$

48) $y = 6^{11x}$ 48) _____

A) $66\ (\ln 6)\ 6^{11x}$ B) $6\ (\ln 11)\ 6^{11x}$ C) $11\ (\ln 6)\ 6^{11x}$ D) $66\ (\ln 11)\ 6^{11x}$

49) $y = 3(9^{5x - 8}) - 6$ 49) _____

A) $15 \ln 27\ (9^{5x - 8})$

B) $15 \ln 9\ (9^{5x - 8})$

C) $45 \ln 9\ (9^{5x - 8})$

D) $45 \ln 27\ (9^{5x - 8})$

50) $y = \frac{9e^x}{2e^x + 1}$ 50) _____

A) $\frac{e^x}{(2e^x + 1)^2}$ B) $\frac{9e^x}{(2e^x + 1)^2}$ C) $\frac{9e^x}{(2e^x + 1)}$ D) $\frac{9e^x}{(2e^x + 1)^3}$

Solve the problem.

51) The sales in thousands of a new type of product are given by $S(t) = 270 - 60e^{-0.1t}$, where t represents time in years. Find the rate of change of sales at the time when $t = 2$. 51) _____

A) –7.3 thousand per year

B) –4.9 thousand per year

C) 4.9 thousand per year

D) 7.3 thousand per year

52) The demand function for a certain book is given by the function $x = D(p) = 54e^{-0.006p}$. Find the marginal demand D'(p). 52) _____

A) $D'(p) = -0.324e^{-0.006p}$

B) $D'(p) = -0.006e^{-0.006p}$

C) $D'(p) = 0.324e^{-0.006p}$

D) $D'(p) = -0.324pe^{-0.006p-1}$

Find the derivative of the function.

53) $y = \ln 9x$ 53) _____

A) $\frac{1}{x}$ B) $-\frac{1}{9x}$ C) $\frac{1}{9x}$ D) $-\frac{1}{x}$

54) $y = \ln 5x^2$ 54) _____

A) $\frac{1}{2x + 5}$ B) $\frac{10}{x}$ C) $\frac{2}{x}$ D) $\frac{2x}{x^2 + 5}$

55) $y = \ln \left| 3x^3 - x^2 \right|$ 55) _____

A) $\frac{3x - 2}{3x^2 - x}$ B) $\frac{9x - 2}{3x^3 - x}$ C) $\frac{9x - 2}{3x^2}$ D) $\frac{9x - 2}{3x^2 - x}$

56) $y = \ln (x + 8)^4$ 56) _____

A) $\frac{8}{x + 8}$ B) $\frac{4}{x + 4}$ C) $\frac{4}{x + 8}$ D) $\frac{4}{x}$

57) $y = (5x^2 + 5) \ln(x + 8)$ 57) _____

A) $\frac{5x^2 + 5}{\ln(x + 8)} + 10x \ln(x + 8)$ B) $10x \ln(x + 8)$

C) $\frac{5x^2 + 5}{x + 8} + 10x \ln(x + 8)$ D) $\frac{10x}{x + 8}$

Find the derivative.

58) $y = e^x \ln x, x > 0$ 58) _____

A) $\frac{e^x(\ln x + x)}{x}$ B) $\frac{e^x(x \ln x + 1)}{x}$ C) $\frac{e^x}{x}$ D) $e^x \ln x$

59) $y = e^{x^3} \ln x$ 59) _____

A) $\frac{e^{x^3} + 3e^{x^3} \ln x}{x}$ B) $\frac{e^{x^3} + 3x^3 e^{x^3} \ln x}{x}$

C) $\frac{3x^3 e^{x^3} + 1}{x}$ D) $\frac{e^{x^3} + 3x^2 e^{x^3} \ln x}{x}$

Find the derivative of the function.

60) $y = \log (2x)$ 60) _____

A) $\frac{1}{x(\ln 2)}$ B) $\frac{1}{x(\ln 10)}$ C) $\frac{1}{\ln 10}$ D) $\frac{1}{x}$

61) $y = \log |6 - x|$ 61) _____

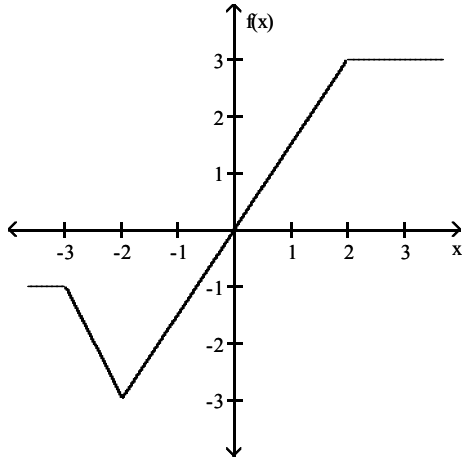
A) $-\frac{1}{\ln 10 (6 - x)}$ B) $-\frac{6 - x}{\ln 10}$ C) $\frac{1}{\ln 10 (6 - x)}$ D) $-\frac{1}{\ln 10}$

62) $y = \log_7 \sqrt{5x + 8}$ 62) _____

A) $\frac{5}{2(\ln 7)(5x + 8)}$ B) $\frac{5 \ln 7}{5x + 8}$ C) $\frac{5}{\ln 7}$ D) $\frac{5}{\ln 7\,(5x + 8)}$

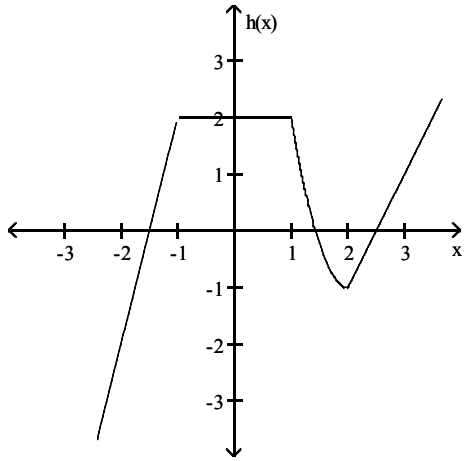
Identify the open intervals where the function is changing as requested.

63) Increasing 63) _____



A) (–2, ∞) B) (–3, ∞) C) (–2, 2) D) (–3, 3)

64) Increasing 64) _____



A) (–∞, –1) B) (–1, 2) C) (–∞,–1), (2, ∞) D) (–1, ∞)

Find the open interval(s) where the function is changing as requested.

65) Increasing; $y = 7x - 5$ 65) _____

A) (–5, 7) B) (–5, ∞) C) (–∞, 7) D) (–∞, ∞)

66) Decreasing; $f(x) = x^3 - 4x$ 66) _____

A) (–∞, ∞) B) $\left(\frac{2\sqrt{3}}{3}, \infty\right)$ C) $\left(-\infty, -\frac{2\sqrt{3}}{3}\right)$ D) $\left(-\frac{2\sqrt{3}}{3}, \frac{2\sqrt{3}}{3}\right)$

67) Increasing; $y = \sqrt{x^2 + 3}$ 67) _____

A) (0, ∞) B) (–∞, 0) C) (–1, ∞) D) none

68) Increasing; $f(x) = x^2 - 2x + 1$ 68) _____

A) $(0, \infty)$ B) $(-\infty, 1)$ C) $(-\infty, 0)$ D) $(1, \infty)$

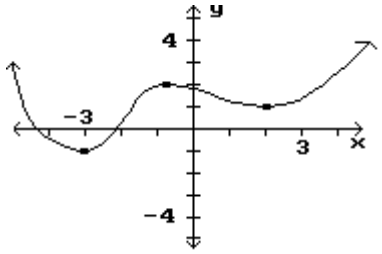
Solve the problem.

69) Suppose the total cost C(x) to manufacture a quantity x of insecticide (in hundreds of liters) is given by $C(x) = x^3 - 27x^2 + 240x + 850$. Where is C(x) decreasing? 69) _____

A) (8, 850) B) (0, 850) C) (10, 850) D) (8, 10)

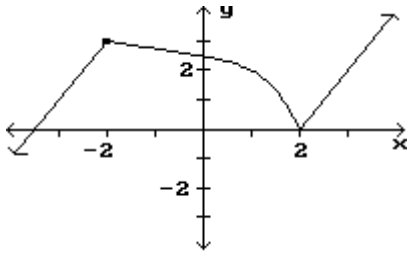
Find the location and value of all relative extrema for the function.

70) 70) _____



A) Relative minimum of –3 at –1 ; Relative maximum of –1 at 2 ; Relative minimum of 2 at 1.
B) Relative minimum of 0 at –2 ; Relative maximum of –1 at 2 ; Relative minimum of 2 at 1.
C) Relative minimum of –1 at –3 ; Relative maximum of 2 at –1 ; Relative minimum of 1 at 2.
D) Relative minimum of –1 at –3 ; Relative maximum of 2 at –1 ; Relative minimum of 0 at 2.

71) 71) _____



A) Relative maximum of 3 at –2 ; Relative minimum of 0 at 2.
B) Relative minimum of 0 at 2.
C) Relative maximum of 3 at –2.
D) None

Find the x–value of all points where the function has relative extrema. Find the value(s) of any relative extrema.

72) $f(x) = x^2 + 2x - 3$ 72) _____

A) Relative maximum of –4 at –1. B) Relative minimum of –2 at 0.
C) Relative minimum of –4 at –1. D) Relative minimum of 0 at –2.

73) $f(x) = x^3 - 3x^2 + 1$ 73) _____

A) Relative maximum of 0 at 1; Relative minimum of –3 at –2.
B) Relative maximum of 1 at 0; Relative minimum of –3 at 2.
C) No relative extrema.
D) Relative maximum of 1 at 0.

74) $f(x) = 3x^4 + 16x^3 + 24x^2 + 32$ 74) _____

A) Relative minimum of 32 at 0.
B) Relative maximum of 48 at –2; Relative minimum of 32 at 0.
C) No relative extrema.
D) Relative minimum of 30 at –1.

75) $f(x) = \dfrac{1}{x^2 - 1}$ 75) _____

A) Relative maximum of 0 at 1.
B) Relative minimum of –1 at 0.
C) Relative maximum of –1 at 0.
D) No relative extrema.

76) $f(x) = (\ln x)^2$, $x > 0$ 76) _____

A) (1, 0), relative minimum
B) (–1, –1) relative maximum
C) (1, –1), relative maximum
D) (–1, 0), relative minimum

77) $f(x) = x + \ln |x|$ 77) _____

A) (–1, –1) relative maximum
B) (1, –1), relative maximum
C) (1, 0), relative minimum
D) (–1, 0), relative minimum

78) $f(x) = xe^{6x}$ 78) _____

A) $\left(\dfrac{1}{6}, -\dfrac{1}{6e}\right)$, relative maximum
B) $\left(-\dfrac{1}{6}, -\dfrac{1}{6e}\right)$, relative minimum
C) $\left(\dfrac{1}{6}, \dfrac{e}{6}\right)$, relative minimum
D) $\left(-\dfrac{1}{6}, -\dfrac{e}{6}\right)$, relative maximum

Find f"(x) for the function.

79) $f(x) = 8x^2 + 8x - 6$ 79) _____

A) 0 B) 8 C) 16 D) $16x + 8$

80) $f(x) = 2x^{3/2} - 6x^{1/2}$ 80) _____

A) $3x^{-1/2} + 3x^{-3/2}$
B) $3x^{1/2} - 3x^{-1/2}$
C) $1.5x^{-1/2} + 1.5x^{-3/2}$
D) $1.5x^{1/2} + 1.5x^{-1/2}$

81) $f(x) = x^2 + \sqrt{x}$ 81) _____

A) $\dfrac{2x^{3/2} - 1}{x^{3/2}}$ B) $\dfrac{8x^{3/2} + 1}{4x^{3/2}}$ C) $\dfrac{2x^{3/2} + 1}{x^{3/2}}$ D) $\dfrac{8x^{3/2} - 1}{4x^{3/2}}$

Find the requested value of the second derivative of the function.

82) $f(x) = 9e^{-x^2}$; Find $f''(5)$. 82) _____

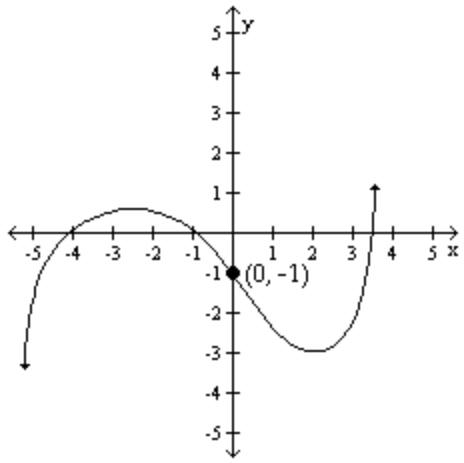
A) $882e^{-25}$ B) $918e^{-50}$ C) $900e^{25}$ D) $891e^{-50}$

83) $f(x) = x^4 + 3x^3 - 2x + 6$; Find $f''(1)$. 83) _____

A) –29 B) 30 C) 34 D) 25

Find the open intervals where the function is concave upward or concave downward. Find any inflection points.

84) 84) _____



A) Concave upward on $(0, \infty)$; concave downward on $(-\infty, 0)$; inflection point at $(0, -1)$

B) Concave upward on $(-1, \infty)$; concave downward on $(-\infty, 2)$; inflection point at $(2, -3)$

C) Concave upward on $(0, \infty)$; concave downward on $(-\infty, 0)$; inflection points at $(-4, 0)$, $(-1, 0)$, and $\left(\frac{7}{2}, 0\right)$

D) Concave upward on $(-1, \infty)$; concave downward on $(-\infty, 2)$; inflection points at $(-1, 0)$ and $(2, -3)$

Find the largest open intervals where the function is concave upward.

85) $f(x) = x^2 + 2x + 1$ 85) _____

A) $(-\infty, \infty)$ B) None C) $(-1, \infty)$ D) $(-\infty, -1)$

86) $f(x) = 4x^3 - 45x^2 + 150x$ 86) _____

A) $\left(-\infty, \frac{15}{4}\right)$ B) $\left(-\infty, -\frac{15}{4}\right)$ C) $\left(\frac{15}{4}, \infty\right)$ D) $\left(-\frac{15}{4}, \infty\right)$

87) $f(x) = \frac{x}{x^2 + 1}$ 87) _____

A) $(-\infty, -1)$ B) None C) $(\sqrt{3}, \infty)$ D) $(-\infty, -1), (-1, \infty)$

Find any inflection points given the equation.

88) $f(x) = 7x^2 + 14x$ 88) _____

A) Inflection point at $(-1, -7)$

B) Inflection point at $(-2, -14)$

C) No inflection points

D) Inflection point at $(2, -14)$

89) $f(x) = \frac{2x}{x^2 + 1}$ 89) _____

A) Inflection points at $(0, 0)$, $(-1, -1)$, $(1, 1)$

B) Inflection points at $(0, 0)$, $\left(-1\sqrt{3}, -\frac{1}{2}\sqrt{3}\right), \left(1\sqrt{3}, \frac{1}{2}\sqrt{3}\right)$

C) No inflection points

D) Inflection points at $(-1, -1)$, $(1, 1)$

Decide if the given value of x is a critical number for f, and if so, decide whether the point is a relative minimum, relative maximum, or neither.

90) $f(x) = -x^2 - 16x - 64;\ x = 8$ 90) _____

A) Critical number, relative minimum at (8, –144)
B) Not a critical number
C) Critical number but not an extreme point
D) Critical number, relative maximum at (8, –144)

91) $f(x) = (x^2 - 6)(2x - 3);\ x = \frac{1}{2}$ 91) _____

A) Critical number, relative minimum at $\left(\frac{1}{2}, \frac{23}{2}\right)$
B) Not a critical number
C) Critical number, relative maximum at $\left(\frac{1}{2}, \frac{23}{2}\right)$
D) Critical number but not an extreme point

92) $f(x) = 3x^4 - 4x^3 - 12x^2 + 24;\ x = 0$ 92) _____

A) Critical number, relative minimum at (0, 24)
B) Critical number but not an extreme point
C) Critical number, relative maximum at (0, 24)
D) Not a critical number

Solve the problem.

93) Find the point of diminishing returns (x, y) for the function $R(x) = 3000 - x^3 + 36x^2 + 800x$, $0 \le x \le 20$, where R(x) represents revenue in thousands of dollars and x represents the amount spent on advertising in tens of thousands of dollars. 93) _____

A) (12 , 16,056) B) (14 , 18,512)
C) (56.26, –16,118.7) D) (14.4, 18,998.98)

Find the indicated absolute extremum as well as all values of x where it occurs on the specified domain.

94) $f(x) = x^2 - 4;\ [-1, 2]$ 94) _____

Maximum

A) –3 at x = –1 B) 0 at x = 2 C) 0 at x = –2 D) –3 at x = 1

95) $f(x) = \frac{1}{3}x^3 - 2x^2 + 3x - 4;\ [-2, 5]$ 95) _____

Minimum

A) $-\frac{8}{3}$ at x = 1 B) –4 at x = 0 C) $-\frac{62}{3}$ at x = –2 D) $-\frac{10}{3}$ at x = 2

96) $f(x) = \frac{x + 3}{x - 3};\ [-4, 4]$ 96) _____

Maximum

A) 7 at x = 4 B) –1 at x = 0

C) No absolute maximum D) $\frac{1}{7}$ at x = –4

Solve the problem.

97) $P(x) = -x^3 + \frac{27}{2}x^2 - 60x + 100$, $x \geq 5$ is an approximation to the total profit (in thousands of dollars) from the sale of x hundred thousand tires. Find the number of hundred thousands of tires that must be sold to maximize profit. 97) _____

A) 5.5 hundred thousand
B) 4 hundred thousand
C) 4.5 hundred thousand
D) 5 hundred thousand

98) $P(x) = -x^3 + 15x^2 - 48x + 450$, $x \geq 3$ is an approximation to the total profit (in thousands of dollars) from the sale of x hundred thousand tires. Find the number of hundred thousands of tires that must be sold to maximize profit. 98) _____

A) 10 hundred thousand
B) 5 hundred thousand
C) 3 hundred thousand
D) 8 hundred thousand

99) $P(x) = -x^3 + 24x^2 - 144x + 50$, $x \geq 2$ is an approximation to the total profit (in thousands of dollars) from the sale of x hundred thousand tires. Find the number of hundred thousands of tires that must be sold to maximize profit. 99) _____

A) 10 hundred thousand
B) 12 hundred thousand
C) 4 hundred thousand
D) 2 hundred thousand

100) Find the elasticity of demand E for the demand function $q = 4400 - 17p$. 100) _____

A) $E = \frac{17p}{17p - 4400}$ B) $E = \frac{17p - 4400}{17p}$ C) $E = \frac{4400 - 17p}{17p}$ D) $E = \frac{17p}{4400 - 17p}$

101) Find the elasticity of demand E for the demand function $q = 10 - \ln p$ 101) _____

A) $E = \frac{1}{10 - \ln p}$ B) $E = \frac{-p}{10p - \ln p}$ C) $E = \frac{-p}{10 - \ln p}$ D) $E = \frac{10 - \ln p}{p^2}$

102) Given the demand function $q = 510 - 2p$, determine the price where demand has unit elasticity. 102) _____

A) $p = 45.16$ B) $p = 127.5$ C) $p = 63.75$ D) $p = 22.58$

103) The demand for boneless chicken breast, in dollars per pound, is given by $q = -0.6p + 5$, where p represents the price per pound and q represents the average number of pounds purchased per week per customer. Determine the price at which the demand for boneless chicken breast is unit elastic. 103) _____

A) $4.17 per pound
B) $5.10 per pound
C) $8.33 per pound
D) The demand is not unit elastic at any price.

Find dy/dx by implicit differentiation.

104) $x^3 + y^3 = 5$ 104) _____

A) $-\frac{x^2}{y^2}$ B) $\frac{y^2}{x^2}$ C) $-\frac{y^2}{x^2}$ D) $\frac{x^2}{y^2}$

105) $x^{1/3} - y^{1/3} = 1$ 105) _____

A) $\left(\frac{x}{y}\right)^{2/3}$ B) $\left(\frac{y}{x}\right)^{2/3}$ C) $-\left(\frac{y}{x}\right)^{2/3}$ D) $-\left(\frac{x}{y}\right)^{2/3}$

106) $2xy - y^2 = 1$ 106) _____

A) $\frac{y}{y - x}$ B) $\frac{y}{x - y}$ C) $\frac{x}{x - y}$ D) $\frac{x}{y - x}$

107) $\frac{x + y}{x - y} = x^2 + y^2$ 107) _____

A) $\frac{x(x - y)^2 - y}{x + y(x - y)^2}$ B) $\frac{x(x - y)^2 + y}{x + y(x - y)^2}$ C) $\frac{x(x - y)^2 - y}{x - y(x - y)^2}$ D) $\frac{x(x - y)^2 + y}{x - y(x - y)^2}$

108) $xy + x = 2$ 108) _____

A) $\frac{1 + y}{x}$ B) $-\frac{1 + x}{y}$ C) $-\frac{1 + y}{x}$ D) $\frac{1 + x}{y}$

109) $y^5e^x + x = y^6x$ 109) _____

A) $\frac{dy}{dx} = \frac{y^6 - 1}{5y^4e^x - 6xy^5}$ B) $\frac{dy}{dx} = \frac{y^6 - y^5e^x - 1}{5y^4e^x - 6xy^5 - 1}$

C) $\frac{dy}{dx} = \frac{y^6 - 1}{5y^4e^x - 6xy^5 + 1}$ D) $\frac{dy}{dx} = \frac{y^6 - y^5e^x - 1}{5y^4e^x - 6xy^5}$

Assume x and y are functions of t. Evaluate dy/dt.

110) $x^{4/3} + y^{4/3} = 2$; $dx/dt = 6$, $x = 1$, $y = 1$ 110) _____

A) $-\frac{1}{6}$ B) -6 C) 6 D) $\frac{1}{6}$

111) $xy + x = 12$; $dx/dt = -3$, $x = 2$, $y = 5$ 111) _____

A) -3 B) -9 C) 9 D) 3

112) $\frac{x + y}{x - y} = x^2 + y^2$; $dx/dt = 12$, $x = 1$, $y = 0$ 112) _____

A) 12 B) $-\frac{1}{12}$ C) $\frac{1}{12}$ D) -12

113) $x^2 \ln y = -3 + xe^y$; $dx/dt = 4$, $x = 3$, $y = 1$ 113) _____

A) 0 B) $\frac{4e}{3 - e}$ C) 1 D) $\frac{4e}{3(3 - e)}$

Solve the problem.

114) A product sells by word of mouth. The company that produces the product has noticed that revenue from sales is given by $R(t) = 3\sqrt{x}$, where x is the number of units produced and sold. If the revenue keeps changing at a rate of \$600 per month, how fast is the rate of sales changing when 1000 units have been made and sold? (Round to the nearest dollar per month.) 114) _____

A) \$113,842/month B) \$13/month

C) \$6325/month D) \$12,649/month

Find the integral.

115) $\int x^{14}\,dx$ 115) _____

A) $15x^{15} + C$ B) $14x^{13} + C$ C) $\frac{x^{15}}{15} + C$ D) $\frac{x^{13}}{14} + C$

116) $\int 12x^3\sqrt{x}\,dx$ 116) _____

A) $\frac{2}{9}x^{9/2} + C$ B) $\frac{24}{7}x^{9/2} + C$ C) $\frac{8}{3}x^{9/2} + C$ D) $\frac{11}{5}x^{9/2} + C$

117) $\int \frac{33}{x^2}\,dx$ 117) _____

A) $\frac{33}{x} + C$ B) $33x + C$ C) $-33x + C$ D) $-\frac{33}{x} + C$

118) $\int (4x^2 + 1)\,dx$ 118) _____

A) $\frac{4}{3}x^3 + C$ B) $8x + C$ C) $x + C$ D) $\frac{4}{3}x^3 + x + C$

119) $\int (4x^{11} - 7x^3 + 7)\,dx$ 119) _____

A) $12x^{12} - \frac{7}{4}x^4 + 7x + C$ B) $\frac{1}{4}x^{12} - \frac{7}{3}x^4 + 7x + C$

C) $\frac{1}{3}x^{12} - \frac{7}{4}x^4 + 7x + C$ D) $12x^{12} - \frac{7}{3}x^4 + 7x + C$

120) $\int (2x^2 + x^{-4})\,dx$ 120) _____

A) $\frac{2x^3}{3} + \frac{x^{-3}}{3} + C$ B) $-\frac{2x^3}{3} - \frac{x^{-3}}{3} + C$

C) $-\frac{2x^3}{3} + \frac{x^{-3}}{3} + C$ D) $\frac{2x^3}{3} - \frac{x^{-3}}{3} + C$

121) $\int (\sqrt{x} + \sqrt[3]{x})\,dx$ 121) _____

A) $2\sqrt{x} + 2\sqrt[3]{x} + C$ B) $2\sqrt{x} + 3\sqrt[3]{x} + C$

C) $\frac{1}{2}x^{3/2} + \frac{2}{3}x^{4/3} + C$ D) $\frac{2}{3}x^{3/2} + \frac{3}{4}x^{4/3} + C$

122) $\int (t^3 + e^{3t})\,dt$ 122) _____

A) $\frac{t^2}{2} + 3e^{3t} + C$ B) $\frac{t^4}{4} + \frac{e^{3t}}{3} + C$ C) $\frac{t^4}{4} + \frac{e^{4t}}{4} + C$ D) $\frac{t^4}{4} + e^{3t} + C$

123) $\int (7x^{-4} - 5x^{-1})\,dx$ 123) _____

A) $-\frac{7}{3}x^{-3} + 5\ln|x| + C$ B) $\frac{7}{4}x^{-3} + 5\ln|x| + C$

C) $\frac{7}{4}x^{-3} - 5\ln|x| + C$ D) $-\frac{7}{3}x^{-3} - 5\ln|x| + C$

124) $\int (3x + 5x^{-1})\,dx$ 124) _____

A) $\frac{3}{2}x^2 + 5\ln|x| + C$ B) $3x^3 + 30x - \frac{25}{3}x^{-1} + C$

C) $\frac{9}{4}x^4 + 25\ln|x^2| + C$ D) $3x^3 + 15x - \frac{25}{3}x^{-1} + C$

125) $\int \left(\frac{x}{6} + \frac{6}{x}\right)dx$ 125) _____

A) $\frac{1}{12}x^2 + 6\ln|x| + C$ B) $x + C$

C) $\frac{1}{6}x + C$ D) $x\ln 6 + 6\ln|x| + C$

126) $\int \frac{x^5 + 1}{x}\,dx$ 126) _____

A) $\frac{1}{5}x^5 - \ln|x| + C$ B) $\frac{1}{3}x^4 - \ln|x| + C$ C) $\frac{1}{3}x^4 + \ln|x| + C$ D) $\frac{1}{5}x^5 + \ln|x| + C$

127) $\int 8e^{4y}\,dy$ 127) _____

A) $4e^{4y} + C$ B) $\frac{1}{4}e^{4y} + C$ C) $2e^{4y} + C$ D) $\frac{1}{2}e^{4y} + C$

Solve the problem.

128) The slope of the tangent line of a curve is given by 128) _____

$f'(x) = x^2 - 13x + 4$.

If the point (0, 8) is on the curve, find an equation of the curve.

A) $f(x) = \frac{1}{3}x^3 - 14x^2 + 4x + 1$ B) $f(x) = \frac{1}{3}x^3 - 14x^2 + 4x + 8$

C) $f(x) = \frac{1}{3}x^3 - \frac{13}{2}x^2 + 4x + 8$ D) $f(x) = \frac{1}{3}x^3 - \frac{13}{2}x^2 + 4x + 1$

129) Suppose that an object's acceleration function is given by $a(t) = 10t + 6$. The object's initial velocity, $v(0)$, is 2, and the object's initial position, $s(0)$, is 9. Find $s(t)$. 129) _____

A) $s(t) = \frac{5}{3}t^3 + 3t^2 + 2t$ B) $s(t) = \frac{5}{3}t^3 + 3t^2 + 2t + 9$

C) $s(t) = \frac{10}{3}t^3 + 3t^2 + 9t + 2$ D) $s(t) = 5t^2 + 6t + 2$

130) A company has found that its expenditure rate per day (in hundreds of dollars) on a certain type of job is given by $E'(x) = 4x + 9$, where x is the number of days since the start of the job. Find the expenditure if the job takes 8 days. 130) _____

A) $20,000 B) $4100 C) $41 D) $200

Find the integral.

131) $\int 4(2x + 5)^3\,dx$ 131) _____

A) $\frac{3}{4}(2x + 5)^4 + C$ B) $\frac{3}{8}(2x + 5)^4 + C$ C) $\frac{1}{2}(2x + 5)^4 + C$ D) $\frac{1}{4}(2x + 5)^4 + C$

132) $\int \frac{8\,dy}{(y - 9)^3}$ 132) _____

A) $\frac{-4}{(y - 9)^2} + C$ B) $\frac{4}{(y - 9)^2} + C$ C) $\frac{2}{(y - 9)^4} + C$ D) $\frac{-2}{(y - 9)^4} + C$

133) $\int \frac{x}{(7x^2 + 3)^5}\,dx$ 133) _____

A) $\frac{-1}{56(7x^2 + 3)^4} + C$ B) $\frac{-1}{14(7x^2 + 3)^6} + C$

C) $\frac{-7}{3(7x^2 + 3)^4} + C$ D) $\frac{-7}{3(7x^2 + 3)^6} + C$

134) $\int te^{-7t^2}\,dt$ 134) _____

A) $-\frac{1}{14}e^{-7t^2} + C$ B) $-\frac{1}{7}e^{-7t^2} + C$ C) $\frac{1}{14}e^{-7t^2} + C$ D) $\frac{1}{7}e^{-7t^2} + C$

135) $\int \frac{3e^{\sqrt{z}}}{8\sqrt{z}}\,dz$ 135) _____

A) $-24e^{\sqrt{z}} + C$ B) $\frac{3}{4}e^{\sqrt{z}} + C$ C) $-12e^{\sqrt{z}} + C$ D) $\frac{3}{8}e^{\sqrt{z}} + C$

136) $\int \frac{e^x}{e^x + e}\,dx$ 136) _____

A) $\frac{x}{e} + C$ B) $e \ln(e^x + e) + C$ C) $\ln(e^x + e) + C$ D) $x + C$

137) $\int (x^4 - 2x^3)^5(4x^3 - 6x^2)\,dx$ 137) _____

A) $(x^4 - 2x^3)^6 + C$ B) $\frac{1}{6}(x^4 - 2x^3)^6 + C$

C) $\frac{1}{5}(x^4 - 2x^3)^5 + C$ D) $4x^3 - 6x^2 + C$

138) $\int x^3\sqrt{x^4+3}\,dx$ 138) _____

A) $\frac{2}{3}(x^4+3)^{3/2}+C$ B) $\frac{1}{6}(x^4+3)^{3/2}+C$

C) $\frac{8}{3}(x^4+3)^{3/2}+C$ D) $-\frac{1}{2}(x^4+3)^{-1/2}+C$

139) $\int \frac{12x}{(x+4)^4}\,dx$ 139) _____

A) $-\frac{8x}{(x+4)^3}+C$ B) $12\ln|x+4|+C$

C) $-\frac{6}{(x+4)^2}+\frac{16}{(x+4)^3}+C$ D) $12\ln|x+4|^3-48\ln|x+4|^4+C$

140) $\int x^3\sqrt{x^4+7}\,dx$ 140) _____

A) $\frac{1}{8\sqrt{x^4+7}}+C$ B) $\frac{2}{3}(x^4+7)^{3/2}+C$

C) $\frac{1}{6}(x^4+7)^{3/2}+C$ D) $\frac{1}{6}x^4(x^4+7)^{3/2}+C$

141) $\int \frac{(\ln x)^3}{x}\,dx$ 141) _____

A) $\frac{(\ln x)^4}{4}+C$ B) $\frac{(\ln x)^2}{2}+C$ C) $(\ln x)^4+C$ D) $\frac{(\ln x)^4}{4x}+C$

142) $\int \frac{\ln x^6}{x}\,dx$ 142) _____

A) $\frac{1}{6}(\ln x^6)^2+C$ B) $\frac{1}{2}(\ln x^6)^2+C$ C) $\frac{1}{12}(\ln x^6)^2+C$ D) $\frac{1}{\ln x^6}+C$

143) $\int \frac{(1+\ln x)^4}{x}\,dx$ 143) _____

A) $5x^2(1+\ln x)^5+C$ B) $\frac{(1+\ln x)^5}{5x^2}+C$

C) $\frac{(1+\ln x)^5}{5x}+C$ D) $\frac{(1+\ln x)^5}{5}+C$

144) $\int \frac{\log_2 x}{x}$ 144) _____

A) $\frac{(\log_2 x)^2}{2} + C$

B) $\frac{(\log_2 x)^2}{2 \ln 2} + C$

C) $\frac{(\ln 2)(\log_2 x)^2}{2} + C$

D) $\frac{(\ln x)(\log_2 x)^2}{2} + C$

Solve the problem.

145) The rate of expenditure for maintenance of a particular machine is given by $M'(x) = 12x\sqrt{x^2 + 5}$, where x is time measured in years. Total maintenance costs through the second year are \$67. Find the total maintenance function. 145) _____

A) $M(x) = 4(x^2 + 5)^{3/2} + 55$

B) $M(x) = 12(x^2 + 5)^{3/2} + 55$

C) $M(x) = 12(x^2 + 5)^{3/2} - 41$

D) $M(x) = 4(x^2 + 5)^{3/2} - 41$

Evaluate the definite integral.

146) $\int_{-1}^{5} 5 \, dx$ 146) _____

A) 6 B) 20 C) 15 D) 30

147) $\int_{-1}^{0} (3 + x^2) \, dx$ 147) _____

A) $\frac{10}{3}$ B) 0 C) 3 D) –2

148) $\int_{1}^{4} (x^{3/2} + x^{1/2} - x^{-1/2}) \, dx$ 148) _____

A) $\frac{44}{3}$ B) $\frac{226}{15}$ C) $\frac{224}{15}$ D) 46

149) $\int_{-2}^{-1} 4x^{-4} \, dx$ 149) _____

A) $\frac{1}{6}$ B) $\frac{7}{24}$ C) $\frac{7}{6}$ D) 28

150) $\int_{1}^{e} \frac{17}{x} \, dx$ 150) _____

A) $-17e^2$ B) –17 C) 0 D) 17

151) $\int_1^2 x(x^2 + 1)^3\,dx$ 151) _____

A) $\frac{609}{4}$ B) 609 C) $\frac{117}{8}$ D) $\frac{609}{8}$

152) $\int_1^4 \frac{t^2 + 1}{\sqrt{t}}\,dt$ 152) _____

A) $\frac{72}{5}$ B) $\frac{92}{5}$ C) 32 D) $\frac{77}{5}$

153) $\int_0^1 \sqrt{x + 9}\,dx$ 153) _____

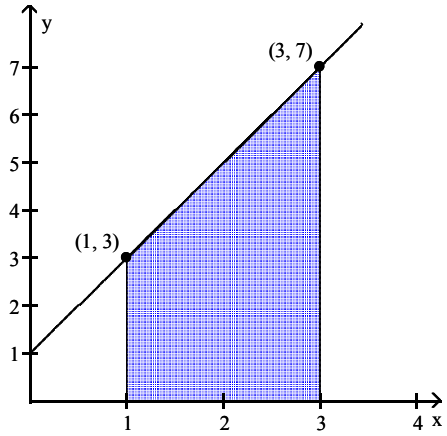
A) $\frac{20}{3}\sqrt{10}$ B) $10\sqrt{10} - 27$ C) $15\sqrt{10} - 15$ D) $\frac{20}{3}\sqrt{10} - 18$

154) $\int_1^2 \frac{5}{x(4 + \ln x)}dx$ 154) _____

A) –0.317 B) 16.534 C) 14.662 D) 0.799

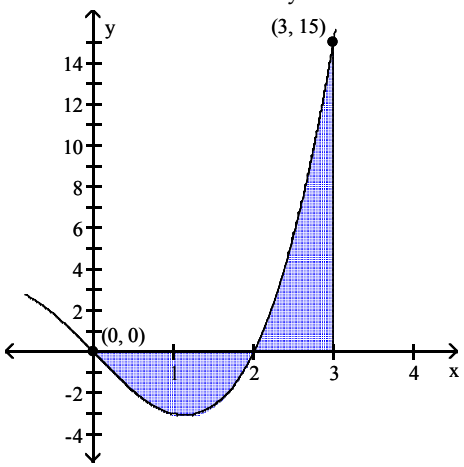
Find the area of the shaded region.

155) $y = 2x + 1$ 155) _____



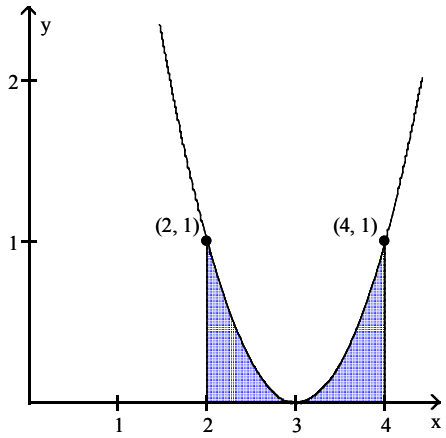
A) 5 B) 12.5 C) 7.5 D) 10

156) $y = x^3 - 4x$ 156) _____



A) $\frac{41}{4}$ B) $\frac{17}{4}$ C) $\frac{33}{4}$ D) $\frac{9}{4}$

157) $y = (x - 3)^2$ 157) _____



A) $\frac{2}{3}$ B) $\frac{5}{3}$ C) $\frac{4}{3}$ D) $\frac{1}{3}$

Use integration by parts to find the integral.

158) $\int 3xe^x \, dx$ 158) _____

A) $3xe^x - 3e^x + C$ B) $3e^x - 3xe^x + C$ C) $xe^x - 3e^x + C$ D) $3e^x - e^x + C$

159) $\int 8x \ln x \, dx$ 159) _____

A) $4x \ln x - 2x + C$ B) $4x^2 \ln x - \frac{x^2}{4} + C$

C) $\frac{x^2}{2} \ln x - \frac{x^2}{4} + C$ D) $4x^2 \ln x - 2x^2 + C$

160) $\int (x + 5) \ln x \, dx$ 160) _____

A) $\frac{1}{2}x^2 \ln x - \frac{1}{4}x^2 + 5x + C$

B) $\frac{1}{2}x^2 \ln x + 5x \ln x - \frac{1}{4}x^2 - 5x + C$

C) $\ln x - \frac{1}{4}x^2 + C$

D) $\frac{1}{2}x^2 \ln x - \frac{1}{4}x^2 + C$

161) $\int (x - 9) e^{4x} dx$ 161) _____

A) $\frac{1}{4}(x - 9)e^{4x} + \frac{1}{16} e^{4x} + C$

B) $4(x - 9)e^{4x} - 16 e^{4x} + C$

C) $(x - 9)e^{4x} - e^{4x} + C$

D) $\frac{1}{4}(x - 9)e^{4x} - \frac{1}{16} e^{4x} + C$

Use integration by parts to find the integral. Round the answer to two decimal places if necessary.

162) $\int_0^1 \frac{x}{\sqrt{x + 1}} \, dx$ 162) _____

A) 0.39 B) –1.33 C) –0.94 D) –2.27

163) $\int_1^4 x\sqrt{4 - x} \, dx$ 163) _____

A) –0.69 B) 5.54 C) –7.62 D) 7.62

Find the average value of the function on the given interval.

164) $f(x) = 3x^2 - 4$; [0, 4] 164) _____

A) 12 B) 16 C) $\frac{12}{3}$ D) 13

165) $f(x) = (7x + 1)^{1/2}$; [0, 5] 165) _____

A) $\frac{430}{21}$ B) $\frac{86}{7}\pi$ C) $\frac{37}{2}$ D) $\frac{86}{21}$

166) $f(x) = \sqrt{x + 2}$; [1, 12] 166) _____

A) 4.290 B) 3.003 C) 2.860 D) 2.622

The function represents the rate of flow of money in dollars per year. Assume a 10–year period and find the present value.

167) f(x) = 500 at 6% compounded continuously 167) _____

A) $4573.43 B) $3759.90 C) $6850.99 D) $12,906.76

168) $f(x) = 500e^{0.04x}$ at 8% compounded continuously 168) _____

A) $18,647.81 B) $4121.00 C) $20,879.00 D) $6147.81

169) f(x) = 0.09x + 300 at 3% compounded continuously 169) _____

A) $17,604.49 B) $2595.51 C) $2162.93 D) $1996.55

The function represents the rate of flow of money in dollars per year. Assume a 10–year period and find the accumulated amount of money flow at t = 10.

170) f(x) = 500 at 2% compounded continuously 170) _____

A) $55,535.07 B) $6760.55 C) $5535.07 D) $25,000.00

171) $f(x) = 500e^{0.04x}$ at 6% compounded continuously 171) _____

A) $8257.35 B) $55,638.52 C) $10,085.55 D) $82,848.59

172) f(x) = 0.5x at 5% compounded continuously 172) _____

A) $59.48 B) $29.74 C) $629.74 D) $229.74

Solve the problem.

173) An investment is expected to produce a uniform continuous rate of money flow of $500 per year for 10 years. Find the present value at 3% compounded continuously. 173) _____

A) $29,013.64 B) $5830.98 C) $4319.70 D) $12,346.97

174) The rate of a continuous money flow starts at $1000 and decreases exponentially at 4% per year for 10 years. Find the present value if interest is earned at 3% compounded continuously. 174) _____

A) $7191.64 B) $28,767.90 C) $14,482.18 D) $21,379.79

175) A money market fund has a continuous flow of money at a rate of $f(x) = 2200x - 100x^2$ for 10 years. Find the present value of this flow if interest is earned at 7% compounded continuously. 175) _____

A) $318,267.20 B) $50,045.63 C) $339,599.74 D) $89,860.89

Answer Key
Testname: PRACTICE FOR THE FINAL

1) D
2) A
3) D
4) C
5) A
6) B
7) B
8) D
9) B
10) C
11) A
12) C
13) C
14) D
15) C
16) D
17) D
18) A
19) B
20) B
21) D
22) D
23) D
24) A
25) B
26) C
27) B
28) C
29) C
30) B
31) A
32) D
33) A
34) C
35) B
36) C
37) A
38) B
39) C
40) D
41) D
42) A
43) B
44) A
45) D
46) A
47) B
48) C
49) B
50) B

51) C
52) A
53) A
54) C
55) D
56) C
57) C
58) B
59) B
60) B
61) A
62) A
63) C
64) C
65) D
66) D
67) A
68) D
69) D
70) C
71) A
72) C
73) B
74) A
75) C
76) A
77) A
78) B
79) C
80) C
81) D
82) A
83) B
84) A
85) A
86) C
87) C
88) C
89) B
90) B
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92) C
93) A
94) B
95) C
96) C
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107) D
108) C
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162) A
163) D
164) A
165) D
166) C
167) B
168) B
169) B
170) C
171) A
172) B
173) C
174) A
175) B